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The following program was then given: "Cultural value of college mathematics," J. S. Mikesh; "Report of current research in transcendental curves and numbers," Dr. H. L. Slobin; "Thoughts on a natural number system," L. E. Lunn, Heron Lake; "A solution of the differential equation $dy/dt + (\alpha + \beta \cos t)y = \rho \cos t$," W. O. Beal; "Unification of mathematics in the high school and college," W. D. Reeve.

W. D. Reeve, *Secretary.*

BOOK REVIEWS.

Send all communications to W. H. Bussey, University of Minnesota.

New Books Received.

Elements of Analytic Geometry. By Alexander Ziwet and Louis Allen Hopkins. The Macmillan Company, New York, 1916. viii + 272 pages. $1.60.

First Year Mathematics. By George W. Evans and John A. Marsh. Charles E. Merrill Co., New York, 1916. 253 pages. $0.90.

Projective Ornament. By Claude Bragdon. The Manas Press, Rochester, N. Y., 1915. 79 pages. $1.50.

A Primer of Higher Space. By Claude Bragdon. The Manas Press, Rochester, N. Y., 1913. 79 pages. $1.25.

Four Dimensional Vistas. By Claude Bragdon. Alfred A. Knopf, New York, 1916. 134 pages. $1.25.

A Short Course in Elementary Mechanics for Engineers. By Clifford Newton Mills. D. Van Nostrand Co., New York, 1916. xi + 127 pages. $1.00.

Introduction to Mathematics. Junior High School Series. By Robert L. Short and William H. Elson. D. C. Heath and Co., Boston, 1916. vii + 200 pages. $1.00.

New Plane and Solid Geometry. By Edward Rutledge Robbins. American Book Company, New York, 1916. viii + 460 pages.

Differential Calculus. By H. B. Phillips. John Wiley and Sons, New York, 1916. v + 162 pages.

This small compact volume contains a brief course on differential calculus in 139 pages followed by 14 pages of supplementary exercises and 9 pages devoted to answers to problems and an index. It contains all that can be covered in a semester course of 3 hours a week. It may even be made to serve as the basis of a four- or five-hour course. The following quotation from the preface tells what was the author's idea in writing the book: "In this text on differential calculus I have continued the plan adopted for my Analytic Geometry, wherein a few central methods are expounded and applied to a large variety of examples to the end that the student may learn principles and gain power. In this way the differential calculus makes only a brief text suitable for a term's work and leaves for the integral calculus, which in many respects is far more important, a greater proportion of time than is ordinarily devoted to it."

The reviewer finds the following things about the book worthy of comment: (1) In the "Introduction" (Chapter I), along with the usual definition of infinitesimals, is given the idea of the *order of infinitesimals.* (2) "Derivatives and Differentials" are taken up side by side in Chapter II. (3) Applications of differential calculus to "Rates" (Chapter IV) and "Maxima and Minima" (Chapter V) are given right after "Differentiation of Algebraic Functions" (Chapter III). "Transcendental Functions" are not introduced until Chapter VI. (4) Maxima and Minima are treated without the use of second derivatives. (5) The number e is introduced in Chapter VI as the number satisfying the relation

$$\lim_{x \doteq 0} \frac{e^x - 1}{x} = 1.$$

and the approximate value of e is not computed until Chapter X on "Series and Approximations" is reached. (6) Chapter VII contains "Geometrical Applications" to both plane and solid geometry and they are so arranged that the latter may be omitted if it is desired. (7) There are numerous applications to the simpler problems of mechanics in the plane and in space.

The chapter headings not already mentioned are Chapter VIII, "Velocity and Acceleration in a Curved Path," Chapter IX, "Rolle's Theorem and Indeterminate Forms," and Chapter XI, "Partial Differentiation."

The supplementary exercises at the end of the book (pages 140–153) are to be used as "material for review and to provide problems for which answers are not given.

The book seems to be one which will teach the student not only the mechanical part of differential calculus but also the true value of the processes involved.

A. L. UNDERHILL.

UNIVERSITY OF MINNESOTA.

PROBLEMS FOR SOLUTION.

SEND ALL COMMUNICATIONS ABOUT PROBLEMS TO B. F. FINKEL, Springfield, Mo.

ALGEBRA.

475. Proposed by E. B. ESCOTT, Kansas City, Mo.

A man makes a contract to purchase a house, making a cash payment down and agreeing to make monthly payments of a dollars, interest being charged at six per cent., the balance of the monthly payments being credited on the principal. Find a formula for M_n, the balance due after n payments.

476. Proposed by W. HAROLD WILSON, University of Illinois.

Prove that, if $x_h \neq x_j$, $h, j = 1, 2, 3 \cdots n$, $h \neq j$, then

$$\sum_{i=1}^{n} \frac{x_i^{n-1}}{\prod_{h=1}^{n} (x_i - x_h)'} = 1,$$

where the prime indicates the omission of zero factors in the denominators.

GEOMETRY.

508. Proposed by J. E. ROWE, State College, Penn.

The trilinear coördinates of the vertices of the Brocard triangle are $(s_3^3, s_1s_2s_3, s_1^3)$, $(s_2^3, s_1^3, s_1s_2s_3)$, and $(s_1s_2s_3, s_3^3, s_2^3)$, where s_i $(i = 1, 2, 3)$ are the sines of the angles of the funda-